



**Environmental  
Protection Agency**

Division of Surface Water

# **Application for Authorization Class B Biosolids Beneficial Use Sites**

Division of Surface Water  
Application for Authorization  
Class B Beneficial Use Sites

Form BUA-1

**Biosolids Treatment Works Information**

Treatment works name: Ringler Energy, LLC		
Ohio NPDES permit #: 4IN00204*AD	County: Morrow	
Mailing address: 2881 County Road 156		
City: Cardington	State: OH	Zip: 4315
Operator of record: Bruce Bailey, Vice President of Technical Affairs		
Telephone number: 216-986-9999		
Email address (if available): <a href="mailto:bbailey@quasareg.com">bbailey@quasareg.com</a>		

**Certification Statement**

1. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.
2. I have read and understand Chapter 3745-40 of the Ohio Administrative Code (OAC) and I agree to beneficially use biosolids in accordance with all applicable beneficial use requirements and restrictions established in Chapter 3745-40 of the Ohio Administrative Code.
3. I agree to only beneficially use biosolids that have satisfied a pathogen reduction alternative and a vector attraction reduction option and have metals concentration below the pollutant ceiling concentrations as established in Chapter 3745-40 of the Ohio Administrative Code.
4. I agree to maintain all applicable records established in Chapter 3745-40 of the Ohio Administrative Code.

  
\_\_\_\_\_  
Signature

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Date

Division of Surface Water  
Application for Authorization  
Class B Beneficial Use Sites

Form BUA-2

Owner Consent for Beneficial Use

Exemption 6

Certification Statement

1. I agree to allow biosolids generated by the treatment plant identified on Form BUA-1 to be beneficially used on my property at agronomic rates.
2. I agree to allow federal, state and local regulatory staff access to the beneficial use site for the purposes of inspecting and authorizing the beneficial use site, beneficially using biosolids, and collecting and analyzing samples from the beneficial use site. I reserve the right to ask the above parties for proper identification at any time.
3. I certify that I am holder of legal title to the property described on application form BUA-4, or am authorized by the holder to give consent for the land application of biosolids, and that there are no restrictions to the granting of consent under this form.

Exemption 6

10 / 29 / 14  
Date

In the event the owner of the beneficial use site changes, Form BUA-2 must be revised and resubmitted to Ohio EPA.



Form BUA-3

Beneficial Use Site Operator Consent for Beneficial Use

Exemption 6

Certification Statement

I agree to be responsible for complying with all applicable beneficial use requirements established in Chapter 3745-40 of the Ohio Administrative Code.

Exemption 6

10 / 29 / 14  
Date

In the event the operator of the beneficial use site changes, Form BUA-3 must be revised and resubmitted to Ohio EPA.

Beneficial User Information

Beneficial user:		
Contact person:		
Mailing address:		
City:	State:	Zip:
Telephone number:		

quasar energy group  
7624 Riverview Road  
Cleveland, OH 44141

(216) 986-9999  
[www.quasarenergygroup.com](http://www.quasarenergygroup.com)





MOQ-08-01

MOQ-08-02

MOQ-08-03

Ohio

Ashley

229

Marengo-Norton

© 2014 Google

Google earth

24

5740 ft





MOQ-08-01

160

21

854 ft

© 2014 Google

Google earth

ED\_014244A\_00000186-00006

Division of Surface Water  
Application for Authorization  
Class B Beneficial Use Sites

Form BUA-4 Page 1 of 2

Beneficial Use Site Information

Ohio EPA Site I.D. (Ohio EPA Use Only)

Field site I.D.: MOQ-08-01	
Beneficial use site location: W of Ashley-Westfield Rd., 0.2 miles S of Prospect Mt. Vernon Rd.	
County: Morrow	Township: Westfield
Latitude: 40°25'27.91"N	Longitude: 82°57'55.11"W

Total acreage proposed for beneficial use: 49.9															
Soil pH (s.u.): 6.5	Soil phosphorus (mg/kg): 39.5														
Bedrock depth (feet): >3ft	Bray Kurtz P1 <input checked="" type="checkbox"/> Mehlich 3 <input type="checkbox"/>														
Type of crops to be grown:															
<table border="1"><thead><tr><th>Crop Type</th><th>Expected Yield</th></tr></thead><tbody><tr><td>Corn</td><td>185 bu</td></tr><tr><td>Soybeans</td><td>60 bu</td></tr><tr><td>Wheat</td><td></td></tr><tr><td>Pasture</td><td></td></tr><tr><td>Hay</td><td></td></tr><tr><td>Other:</td><td></td></tr></tbody></table>		Crop Type	Expected Yield	Corn	185 bu	Soybeans	60 bu	Wheat		Pasture		Hay		Other:	
Crop Type	Expected Yield														
Corn	185 bu														
Soybeans	60 bu														
Wheat															
Pasture															
Hay															
Other:															

**Division of Surface Water**  
Application for Authorization  
Class B Beneficial Use Sites

Soil Types:

Soil Unit Symbol	Soil Unit Name	Hydrologic Soil Group
Blg1A1	Blount silt loam, ground moraine, 0 to 2 percent slopes	D
Gwg1B1	Glynwood silt loam, ground moraine, 2 to 6 percent slopes	D
Pm	Pewamo silty clay loam	C/D

Are any endangered species or endangered species habitats located on the beneficial use site?

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
------------------------------	--

If "Yes" is marked, list the types of endangered species or endangered species habitat:

--	--

Have biosolids been beneficially used on the site since July 20, 1993?

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
------------------------------	--

If "Yes" is marked, list the biosolids generators and years beneficial use occurred:

Generator	Year of Beneficial Use

The application must also include all of the following.

- A soil map of the proposed beneficial use site.
- An aerial map of the proposed beneficial use site that clearly identifies the entrance of the beneficial use site from the nearest road and all applicable isolation distances as established in Chapter 3745-40 of the Ohio Administrative Code.
- A vicinity road map at or near the township level that clearly identifies the proposed beneficial use site with all roads labeled.
- A copy of the most recent soil test results identified in this form.

# Staley MOQ-08-01

Total Acreage: 49.9 acres



0 150 300 600 Feet

- Residences
- 100ft Res Buffer
- 33ft Water Buffer
- Waterways
- 300ft Res Buffer



# Staley MOQ-08-01

Total Acreage: 49.9 acres



0 150 300 600 Feet

—— 5ft Contours


# Custom Soil Resource Report Soil Map



## Custom Soil Resource Report

### MAP LEGEND

#### Area of Interest (AOI)

 Area of Interest (AOI)


#### Soils


 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

#### Special Point Features

 Blowout


 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill


 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip


 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features


#### Water Features


 Streams and Canals

#### Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

#### Background

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morrow County, Ohio  
Survey Area Data: Version 13, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 5, 2011—Mar 10, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



## Map Unit Legend

Morrow County, Ohio (OH117)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Blg1A1	Blount silt loam, ground moraine, 0 to 2 percent slopes	14.4	29.1%
Gwg1B1	Glynwood silt loam, ground moraine, 2 to 6 percent slopes	12.2	24.7%
Pm	Pewamo silty clay loam	22.8	46.2%
<b>Totals for Area of Interest</b>		<b>49.4</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If

## Morrow County, Ohio

### Blg1A1—Blount silt loam, ground moraine, 0 to 2 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2skcv  
*Elevation:* 700 to 1,300 feet  
*Mean annual precipitation:* 34 to 42 inches  
*Mean annual air temperature:* 48 to 54 degrees F  
*Frost-free period:* 140 to 180 days  
*Farmland classification:* Prime farmland if drained

#### Map Unit Composition

*Blount, ground moraine, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Blount, Ground Moraine

##### Setting

*Landform:* Ground moraines on till plains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Wisconsin till derived from limestone and shale

##### Typical profile

*Ap - 0 to 10 inches:* silt loam  
*Bt - 10 to 33 inches:* silty clay  
*BC - 33 to 39 inches:* clay loam  
*Cd - 39 to 79 inches:* clay loam

##### Properties and qualities

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* 31 to 54 inches to densic material  
*Natural drainage class:* Somewhat poorly drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately high  
(0.01 to 0.20 in/hr)  
*Depth to water table:* About 6 to 12 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 35 percent  
*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)  
*Available water storage in profile:* Moderate (about 6.2 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* D

#### Minor Components

##### Pewamo, ground moraine

*Percent of map unit:* 9 percent

## Custom Soil Resource Report

*Landform:* Ground moraines on till plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave, linear

### **Glynwood, ground moraine**

*Percent of map unit:* 6 percent  
*Landform:* Ground moraines on till plains  
*Landform position (two-dimensional):* Shoulder, backslope  
*Landform position (three-dimensional):* Side slope, nose slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear

## **Gwg1B1—Glynwood silt loam, ground moraine, 2 to 6 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 2v4bl  
*Elevation:* 700 to 1,300 feet  
*Mean annual precipitation:* 34 to 42 inches  
*Mean annual air temperature:* 48 to 54 degrees F  
*Frost-free period:* 140 to 180 days  
*Farmland classification:* All areas are prime farmland

### **Map Unit Composition**

*Glynwood, ground moraine, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Glynwood, Ground Moraine**

#### **Setting**

*Landform:* Ground moraines on till plains  
*Landform position (two-dimensional):* Shoulder, backslope  
*Landform position (three-dimensional):* Nose slope, side slope  
*Down-slope shape:* Convex, linear  
*Across-slope shape:* Linear, convex  
*Parent material:* Wisconsin till derived from limestone and shale

#### **Typical profile**

*Ap - 0 to 9 inches:* silt loam  
*Bt - 9 to 29 inches:* clay  
*BC - 29 to 34 inches:* clay loam  
*Cd - 34 to 79 inches:* clay loam

#### **Properties and qualities**

*Slope:* 2 to 6 percent  
*Depth to restrictive feature:* 28 to 45 inches to densic material  
*Natural drainage class:* Moderately well drained  
*Runoff class:* High

## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately high  
(0.01 to 0.20 in/hr)

*Depth to water table:* About 12 to 24 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum in profile:* 35 percent

*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)

*Available water storage in profile:* Low (about 5.2 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

*Hydrologic Soil Group:* D

### Minor Components

#### Blount, ground moraine

*Percent of map unit:* 9 percent

*Landform:* Ground moraines on till plains

*Landform position (two-dimensional):* Summit, backslope

*Landform position (three-dimensional):* Interfluvium

*Down-slope shape:* Linear, convex

*Across-slope shape:* Linear

#### Pewamo

*Percent of map unit:* 6 percent

*Landform:* Ground moraines on till plains

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Linear

*Across-slope shape:* Concave

## Pm—Pewamo silty clay loam

### Map Unit Setting

*National map unit symbol:* 5q8m

*Elevation:* 600 to 1,400 feet

*Mean annual precipitation:* 29 to 42 inches

*Mean annual air temperature:* 46 to 55 degrees F

*Frost-free period:* 130 to 180 days

*Farmland classification:* Prime farmland if drained

### Map Unit Composition

*Pewamo and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Pewamo

#### Setting

*Landform:* Depressions, drainageways

## Custom Soil Resource Report

*Parent material:* Till

### Typical profile

*H1 - 0 to 15 inches:* silty clay loam  
*H2 - 15 to 66 inches:* silty clay loam  
*H3 - 66 to 80 inches:* clay loam

### Properties and qualities

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Very poorly drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)  
*Depth to water table:* About 0 to 12 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* Frequent  
*Calcium carbonate, maximum in profile:* 30 percent  
*Available water storage in profile:* High (about 10.2 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* C/D

## Minor Components

### Sloan

*Percent of map unit:* 3 percent  
*Landform:* Flood plains

### Condit

*Percent of map unit:* 3 percent  
*Landform:* Depressions on ground moraines  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave

### Carlisle

*Percent of map unit:* 3 percent  
*Landform:* Depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave

### Bennington

*Percent of map unit:* 3 percent  
*Landform:* Rises on ground moraines, rises on end moraines, flats on ground moraines, flats on end moraines  
*Landform position (two-dimensional):* Summit, shoulder  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

### Blount

*Percent of map unit:* 3 percent  
*Landform:* Flats on ground moraines, flats on end moraines, rises on ground moraines, rises on end moraines  
*Landform position (two-dimensional):* Summit, shoulder  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

**More sand and less clay in the subsoil**

*Percent of map unit:*

*Landform:* Depressions, drainageways

**Thinner or lighter colored surface layer**

*Percent of map unit:*

*Landform:* Depressions, drainageways

**Slopes of 3 or 4 percent**

*Percent of map unit:*


*Landform:* Depressions, drainageways

# Custom Soil Resource Report Map—Depth to Any Soil Restrictive Layer (MOQ-08-01)










## MAP LEGEND

### Area of Interest (AOI)








 Area of Interest (AOI)

### Soils







#### Soil Rating Polygons


-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

#### Soil Rating Lines


-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

#### Soil Rating Points

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200

 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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Survey Area Data: Version 13, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 5, 2011—Mar 10, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



**Table—Depth to Any Soil Restrictive Layer (MOQ-08-01)**

Depth to Any Soil Restrictive Layer— Summary by Map Unit — Morrow County, Ohio (OH117)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
Blg1A1	Blount silt loam, ground moraine, 0 to 2 percent slopes	99	14.4	29.1%
Gwg1B1	Glynwood silt loam, ground moraine, 2 to 6 percent slopes	86	12.2	24.7%
Pm	Pewamo silty clay loam	>200	22.8	46.2%
<b>Totals for Area of Interest</b>			<b>49.4</b>	<b>100.0%</b>

**Rating Options—Depth to Any Soil Restrictive Layer (MOQ-08-01)**

*Units of Measure:* centimeters

*Aggregation Method:* Dominant Component

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Lower

*Interpret Nulls as Zero:* No

**Hydrologic Soil Group (MOQ-08-01)**

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

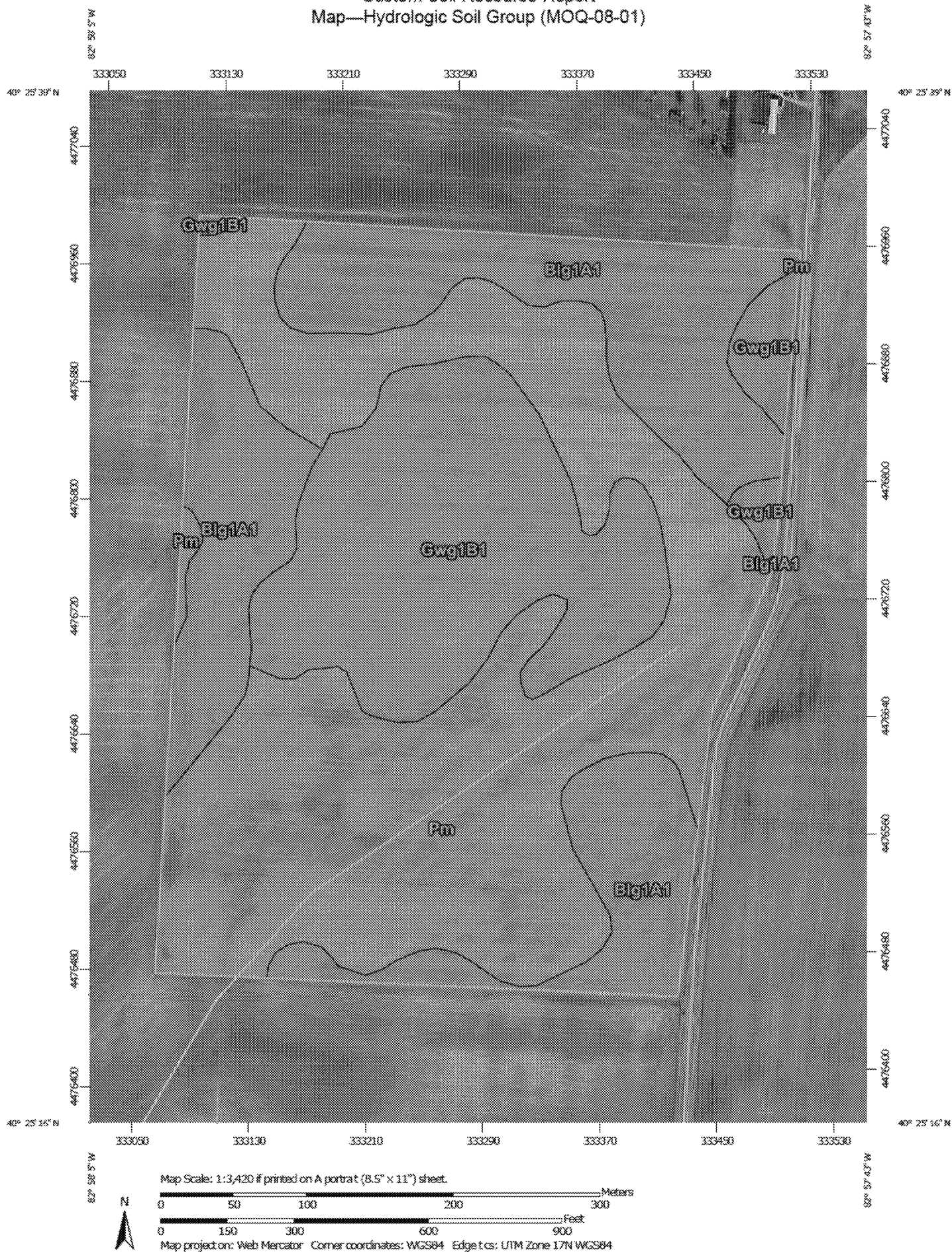
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.


# Custom Soil Resource Report

## Map—Hydrologic Soil Group (MOQ-08-01)











## MAP LEGEND

### Area of Interest (AOI)









 Area of Interest (AOI)

### Soils





#### Soil Rating Polygons





 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines


 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points

 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
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 Local Roads

### Background

 Aerial Photography

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**Table—Hydrologic Soil Group (MOQ-08-01)**

Hydrologic Soil Group— Summary by Map Unit — Morrow County, Ohio (OH117)				
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**Rating Options—Hydrologic Soil Group (MOQ-08-01)**

*Aggregation Method:* Dominant Condition

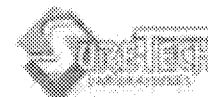
*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

# Soil Analysis Report

JASON STALEY

CENTRAL OHIO FARMERS COOP WALDO B  
420 W MAIN ST  
00111498 HEATHER GOODMAN



Farm BARTLETT

Received: 18-Oct-12

Reported: 22-Oct-14

Lab Number	575971	575972	575973	575974	575975	575976	575977	575978	575979	575980	575981	575982
Field	50	50	50	50	50	50	50	50	50	50	50	50
Sample No.	1	2	3	4	5	6	7	8	9	10	11	12
C.E.C.	19.4	16.9	13.5	11.5	17.0	15.4	12.1	16.1	11.0	9.9	11.3	12.0
Org Matter	4.8	5.3	3.9	2.8	4.0	4.3	3.0	3.7	2.8	2.4	2.7	2.9
Soil pH	6.2	6.5	6.4	6.5	6.2	6.5	6.5	6.4	6.6	6.4	6.6	6.2
Lime Index	66	68	68	69	67	68	69	68	69	69	69	68
P lbs/ac	136	153	187	107	110	109	101	47	41	45	55	56
K lbs/ac	477	582	506	266	410	365	254	281	168	164	261	279
Ca lbs/ac	4268	4226	3206	3029	4075	3880	3214	4128	2909	2583	2988	3120
Mg lbs/ac	810	763	591	573	653	694	614	737	564	484	560	354
SO4S lbs/ac												
B lbs/ac												
Cu lbs/ac												
Mn lbs/ac												
Zn lbs/ac												
Ca Sat'n.	55 %	63 %	59 %	66 %	60 %	63 %	66 %	64 %	66 %	65 %	66 %	65 %
Mg Sat'n.	17 %	19 %	18 %	21 %	16 %	19 %	21 %	19 %	21 %	20 %	20 %	12 %
K Sat'n.	3 %	4 %	5 %	3 %	3 %	3 %	3 %	2 %	2 %	2 %	3 %	3 %
Base Sat'n.	75 %	86 %	82 %	89 %	79 %	85 %	90 %	85 %	89 %	87 %	90 %	80 %
Ca/Mg	3.2	3.3	3.3	3.2	3.7	3.4	3.1	3.4	3.1	3.2	3.2	5.3
Mg/K	5.5	4.3	3.8	7.0	5.2	6.2	7.9	8.6	10.9	9.6	7.0	4.1
Na lbs/ac												
Fe												
SS mS/cm												
lbs/ac												
NO3N ppm												
NH4-N ppm												
Pct. Sand												
Pct. Silt												
Pct. Clay												
Texture												

# Soil Analysis Report

JASON STALEY

CENTRAL OHIO FARMERS COOP WALDO B  
420 W MAIN ST  
00111498 HEATHER GOODMAN



Farm BARTLETT

Received: 18-Oct-12

Reported: 22-Oct-14

Lab Number	575945	575946	575947	575948	575949	575950	575951	575952
Field	50	50	50	50	50	50	50	50
Sample No.	13	14	15	16	17	18	19	20
C.E.C.	11.0	14.2	18.1	16.5	18.4	15.4	16.8	13.2
Org Matter	2.3	4.4	5.0	4.4	5.2	4.2	3.8	2.2
Soil pH	6.6	6.7	6.6	6.5	6.6	6.5	6.7	6.9
Lime Index	70	69	68	68	69	68	69	70
P lbs/ac	38	35	57	42	49	67	79	67
K lbs/ac	213	294	417	295	309	311	310	230
Ca lbs/ac	3248	3895	4637	4166	4765	3796	4765	4269
Mg lbs/ac	632	708	877	800	895	769	805	542
SO4S lbs/ac								
B lbs/ac								
Cu lbs/ac								
Mn lbs/ac								
Zn lbs/ac								
Ca Sat'n.	74 %	59 %	64 %	63 %	65 %	62 %	71 %	81 %
Mg Sat'n.	24 %	21 %	20 %	20 %	20 %	21 %	20 %	17 %
K Sat'n.	3 %	3 %	3 %	2 %	2 %	3 %	2 %	2 %
Base Sat'n.	100 %	92 %	87 %	85 %	87 %	85 %	93 %	100 %
Ca/Mg	3.1	3.3	3.2	3.1	3.2	3.0	3.6	4.7
Mg/K	9.7	7.9	6.9	8.8	9.4	8.1	8.5	7.7
Na lbs/ac								
Fe								
SS mS/cm								
lbs/ac								
NO3N ppm								
NH4-N ppm								
Pct. Sand								
Pct. Silt								
Pct. Clay								
Texture								





MOQ-08-02

MOQ-08-03

Prospect-Mt-Vernon-Rd

21

1526 ft

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Google earth

ED\_014244A\_00000186-00027

Division of Surface Water  
Application for Authorization  
Class B Beneficial Use Sites

Form BUA-4 Page 1 of 2

Beneficial Use Site Information

Ohio EPA Site I.D. (Ohio EPA Use Only)

Field site I.D.: MOQ-08-02	
Beneficial use site location: 1 mi W of Worthington-New Haven Rd. on N side of Prospect Mt. Vernon Rd.	
County: Morrow	Township: Peru
Latitude: 40°25'22.23"N	Longitude: 82°52'21.31"W

Total acreage proposed for beneficial use: 146.2															
Soil pH (s.u.): 6.6	Soil phosphorus (mg/kg): 24.4														
Bedrock depth (feet): >3ft	Bray Kurtz P1 <input checked="" type="checkbox"/> Mehlich 3 <input type="checkbox"/>														
Type of crops to be grown:															
<table border="1"><thead><tr><th>Crop Type</th><th>Expected Yield</th></tr></thead><tbody><tr><td>Corn</td><td>185 bu</td></tr><tr><td>Soybeans</td><td>60 bu</td></tr><tr><td>Wheat</td><td></td></tr><tr><td>Pasture</td><td></td></tr><tr><td>Hay</td><td></td></tr><tr><td>Other:</td><td></td></tr></tbody></table>		Crop Type	Expected Yield	Corn	185 bu	Soybeans	60 bu	Wheat		Pasture		Hay		Other:	
Crop Type	Expected Yield														
Corn	185 bu														
Soybeans	60 bu														
Wheat															
Pasture															
Hay															
Other:															



**Division of Surface Water**  
Application for Authorization  
Class B Beneficial Use Sites

Soil Types:

Soil Unit Symbol	Soil Unit Name	Hydrologic Soil Group
Ble1A1	Blount silt loam, end moraine, 0 to 2 percent slopes	D
Ble1B1	Blount silt loam, end moraine, 2 to 4 percent slopes	D
Gwe5B2	Glynwood clay loam, end moraine, 2 to 6 percent slopes, eroded	D
Pm	Pewamo silty clay loam	C/D

Are any endangered species or endangered species habitats located on the beneficial use site?

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
------------------------------	--

If "Yes" is marked, list the types of endangered species or endangered species habitat:

--	--

Have biosolids been beneficially used on the site since July 20, 1993?

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
------------------------------	--

If "Yes" is marked, list the biosolids generators and years beneficial use occurred:

Generator	Year of Beneficial Use

The application must also include all of the following.

- A soil map of the proposed beneficial use site.
- An aerial map of the proposed beneficial use site that clearly identifies the entrance of the beneficial use site from the nearest road and all applicable isolation distances as established in Chapter 3745-40 of the Ohio Administrative Code.
- A vicinity road map at or near the township level that clearly identifies the proposed beneficial use site with all roads labeled.
- A copy of the most recent soil test results identified in this form.

# Staley MOQ-08-02

Total Acreage: 146.2 acres



0 300 600 1,200 Feet

- Residences
- 100ft Res Buffer
- 33ft Water Buffer
- Waterways
- 300ft Res Buffer

# Staley MOQ-08-02

**Total Acreage: 146.2 acres**

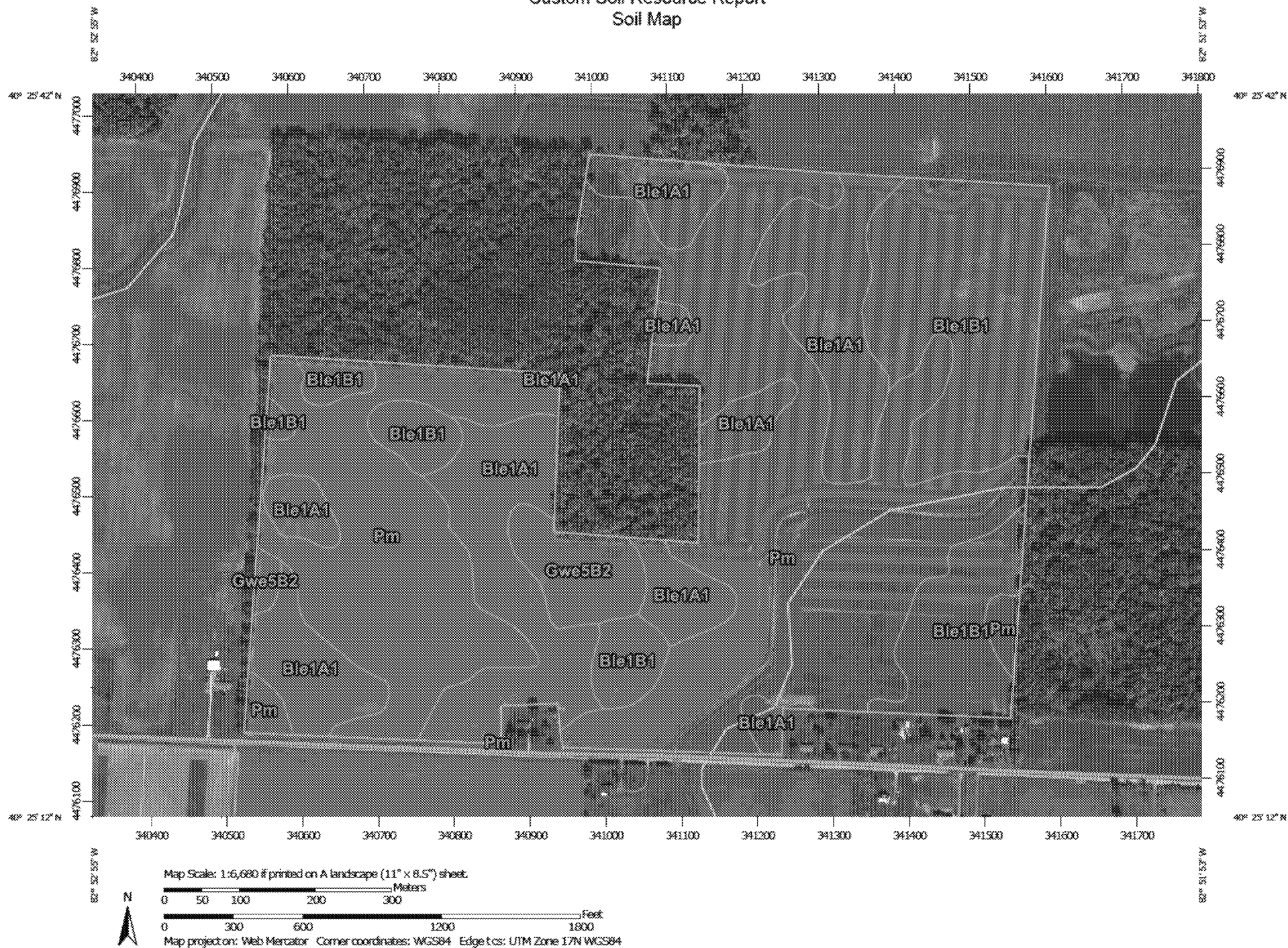


0 300 600 1,200 Feet

—— 5ft Contours




# Custom Soil Resource Report Soil Map



## Custom Soil Resource Report


### MAP LEGEND


#### Area of Interest (AOI)

 Area of Interest (AOI)


#### Soils


 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

#### Special Point Features

 Blowout


 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill


 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip


 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features


#### Water Features

 Streams and Canals

#### Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

#### Background

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morrow County, Ohio  
Survey Area Data: Version 13, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 5, 2011—Mar 10, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Morrow County, Ohio (OH117)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ble1A1	Blount silt loam, end moraine, 0 to 2 percent slopes	37.5	25.7%
Ble1B1	Blount silt loam, end moraine, 2 to 4 percent slopes	31.7	21.7%
Gwe5B2	Glynwood clay loam, end moraine, 2 to 6 percent slopes, eroded	5.2	3.6%
Pm	Pewamo silty clay loam	71.7	49.1%
<b>Totals for Area of Interest</b>		<b>146.1</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic

## Morrow County, Ohio

### Ble1A1—Blount silt loam, end moraine, 0 to 2 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2s1j4  
*Elevation:* 700 to 1,300 feet  
*Mean annual precipitation:* 34 to 42 inches  
*Mean annual air temperature:* 48 to 54 degrees F  
*Frost-free period:* 140 to 180 days  
*Farmland classification:* Prime farmland if drained

#### Map Unit Composition

*Blount, end moraine, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Blount, End Moraine

##### Setting

*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Wisconsin till derived from limestone and shale

##### Typical profile

*Ap - 0 to 10 inches:* silt loam  
*Bt - 10 to 33 inches:* silty clay  
*BC - 33 to 39 inches:* clay loam  
*Cd - 39 to 79 inches:* clay loam

##### Properties and qualities

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* 30 to 60 inches to densic material  
*Natural drainage class:* Somewhat poorly drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately high  
(0.01 to 0.20 in/hr)  
*Depth to water table:* About 6 to 12 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 35 percent  
*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)  
*Available water storage in profile:* Moderate (about 6.2 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* D

#### Minor Components

##### Glynwood, end moraine

*Percent of map unit:* 9 percent

*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Backslope, summit  
*Landform position (three-dimensional):* Side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex

**Pewamo, end moraine**

*Percent of map unit:* 6 percent  
*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear, concave  
*Across-slope shape:* Linear, concave

**Ble1B1—Blount silt loam, end moraine, 2 to 4 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 2s1j5  
*Elevation:* 700 to 1,300 feet  
*Mean annual precipitation:* 34 to 42 inches  
*Mean annual air temperature:* 48 to 54 degrees F  
*Frost-free period:* 140 to 180 days  
*Farmland classification:* Prime farmland if drained

**Map Unit Composition**

*Blount, end moraine, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Blount, End Moraine**

**Setting**

*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Footslope, backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Wisconsin till derived from limestone and shale

**Typical profile**

*Ap - 0 to 9 inches:* silt loam  
*Bt - 9 to 32 inches:* silty clay  
*BC - 32 to 37 inches:* clay loam  
*Cd - 37 to 79 inches:* clay loam

**Properties and qualities**

*Slope:* 2 to 4 percent  
*Depth to restrictive feature:* 30 to 56 inches to densic material  
*Natural drainage class:* Somewhat poorly drained  
*Runoff class:* High



## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately high  
(0.01 to 0.20 in/hr)

*Depth to water table:* About 6 to 12 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum in profile:* 35 percent

*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)

*Available water storage in profile:* Low (about 5.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

*Hydrologic Soil Group:* D

### Minor Components

#### Glynwood, end moraine

*Percent of map unit:* 9 percent

*Landform:* End moraines on till plains

*Landform position (two-dimensional):* Backslope, summit

*Landform position (three-dimensional):* Side slope, crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

#### Pewamo, end moraine

*Percent of map unit:* 6 percent

*Landform:* End moraines on till plains

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Concave

*Across-slope shape:* Concave

### Gwe5B2—Glynwood clay loam, end moraine, 2 to 6 percent slopes, eroded

#### Map Unit Setting

*National map unit symbol:* 2t6lj

*Elevation:* 720 to 1,320 feet

*Mean annual precipitation:* 34 to 42 inches

*Mean annual air temperature:* 48 to 54 degrees F

*Frost-free period:* 140 to 180 days

*Farmland classification:* All areas are prime farmland

#### Map Unit Composition

*Glynwood, end moraine, and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Description of Glynwood, End Moraine

### Setting

*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Shoulder, summit  
*Landform position (three-dimensional):* Side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear, convex  
*Parent material:* Wisconsin till derived from limestone and shale

### Typical profile

*Ap - 0 to 7 inches:* clay loam  
*Bt - 7 to 26 inches:* clay  
*BC - 26 to 30 inches:* clay loam  
*Cd - 30 to 79 inches:* clay loam

### Properties and qualities

*Slope:* 2 to 6 percent  
*Depth to restrictive feature:* 24 to 42 inches to densic material  
*Natural drainage class:* Moderately well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately high (0.01 to 0.20 in/hr)  
*Depth to water table:* About 12 to 24 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 35 percent  
*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)  
*Available water storage in profile:* Low (about 4.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2e  
*Hydrologic Soil Group:* D

## Minor Components

### Blount, end moraine

*Percent of map unit:* 9 percent  
*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Footslope, backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

### Pewamo

*Percent of map unit:* 6 percent  
*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave

## **Pm—Pewamo silty clay loam**

### **Map Unit Setting**

*National map unit symbol:* 5q8m  
*Elevation:* 600 to 1,400 feet  
*Mean annual precipitation:* 29 to 42 inches  
*Mean annual air temperature:* 46 to 55 degrees F  
*Frost-free period:* 130 to 180 days  
*Farmland classification:* Prime farmland if drained

### **Map Unit Composition**

*Pewamo and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Pewamo**

#### **Setting**

*Landform:* Depressions, drainageways  
*Parent material:* Till

#### **Typical profile**

*H1 - 0 to 15 inches:* silty clay loam  
*H2 - 15 to 66 inches:* silty clay loam  
*H3 - 66 to 80 inches:* clay loam

#### **Properties and qualities**

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Very poorly drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)  
*Depth to water table:* About 0 to 12 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* Frequent  
*Calcium carbonate, maximum in profile:* 30 percent  
*Available water storage in profile:* High (about 10.2 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* C/D

### **Minor Components**

#### **Sloan**

*Percent of map unit:* 3 percent  
*Landform:* Flood plains

**Condit**

*Percent of map unit:* 3 percent  
*Landform:* Depressions on ground moraines  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave

**Carlisle**

*Percent of map unit:* 3 percent  
*Landform:* Depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave

**Bennington**

*Percent of map unit:* 3 percent  
*Landform:* Rises on ground moraines, rises on end moraines, flats on ground moraines, flats on end moraines  
*Landform position (two-dimensional):* Summit, shoulder  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

**Blount**

*Percent of map unit:* 3 percent  
*Landform:* Flats on ground moraines, flats on end moraines, rises on ground moraines, rises on end moraines  
*Landform position (two-dimensional):* Summit, shoulder  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

**More sand and less clay in the subsoil**

*Percent of map unit:*  
*Landform:* Depressions, drainageways

**Thinner or lighter colored surface layer**

*Percent of map unit:*  
*Landform:* Depressions, drainageways

**Slopes of 3 or 4 percent**


*Percent of map unit:*  
*Landform:* Depressions, drainageways

Custom Soil Resource Report  
Map—Depth to Any Soil Restrictive Layer (MOQ-08-02)










## MAP LEGEND

### Area of Interest (AOI)








 Area of Interest (AOI)

### Soils







#### Soil Rating Polygons


-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

#### Soil Rating Lines


-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

#### Soil Rating Points

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200

 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morrow County, Ohio  
Survey Area Data: Version 13, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 5, 2011—Mar 10, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



**Table—Depth to Any Soil Restrictive Layer (MOQ-08-02)**

Depth to Any Soil Restrictive Layer— Summary by Map Unit — Morrow County, Ohio (OH117)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
Ble1A1	Blount silt loam, end moraine, 0 to 2 percent slopes	99	37.5	25.7%
Ble1B1	Blount silt loam, end moraine, 2 to 4 percent slopes	94	31.7	21.7%
Gwe5B2	Glynwood clay loam, end moraine, 2 to 6 percent slopes, eroded	76	5.2	3.6%
Pm	Pewamo silty clay loam	>200	71.7	49.1%
<b>Totals for Area of Interest</b>			<b>146.1</b>	<b>100.0%</b>

**Rating Options—Depth to Any Soil Restrictive Layer (MOQ-08-02)**

*Units of Measure:* centimeters

*Aggregation Method:* Dominant Component

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Lower

*Interpret Nulls as Zero:* No

**Hydrologic Soil Group (MOQ-08-02)**

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.


Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils

# Custom Soil Resource Report Map—Hydrologic Soil Group (MOQ-08-02)











## MAP LEGEND

### Area of Interest (AOI)









 Area of Interest (AOI)

### Soils





#### Soil Rating Polygons





 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines


 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points

 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morrow County, Ohio  
 Survey Area Data: Version 13, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 5, 2011—Mar 10, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

**Table—Hydrologic Soil Group (MOQ-08-02)**

Hydrologic Soil Group— Summary by Map Unit — Morrow County, Ohio (OH117)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ble1A1	Blount silt loam, end moraine, 0 to 2 percent slopes	D	37.5	25.7%
Ble1B1	Blount silt loam, end moraine, 2 to 4 percent slopes	D	31.7	21.7%
Gwe5B2	Glynwood clay loam, end moraine, 2 to 6 percent slopes, eroded	D	5.2	3.6%
Pm	Pewamo silty clay loam	C/D	71.7	49.1%
<b>Totals for Area of Interest</b>			<b>146.1</b>	<b>100.0%</b>

**Rating Options—Hydrologic Soil Group (MOQ-08-02)**

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

# Soil Analysis Report

JASON STALEY

CENTRAL OHIO FARMERS COOP WALDO B  
420 W MAIN ST  
00111498 TOM CRAWFORD



Farm

Received: 20-Nov-13

Reported: 22-Oct-14

Lab Number	309891	309892	309893	309894	309895	309896	309897	309898	309899	309900	309901	309902
Field	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK
Sample No.	1	2	3	4	5	6	7	8	9	10	11	12
C.E.C.	11.8	15.6	13.9	14.5	11.8	11.0	20.1	16.7	16.7	14.2	13.7	12.9
Org Matter	2.6	2.6	3.3	2.3	2.7	2.5	4.0	4.3	3.9	2.9	3.5	3.1
Soil pH	6.4	6.7	6.6	7.2	7.0	7.0	6.3	6.7	6.5	7.1	6.8	6.9
Lime Index	69	70	69	70	70	70	67	69	68	70	70	70
P lbs/ac	40	59	74	27	30	21	63	42	55	21	30	33
K lbs/ac	219	290	263	198	206	200	335	317	258	224	226	255
Ca lbs/ac	3047	4688	3891	4800	3666	3447	5071	4657	4066	4220	4020	3771
Mg lbs/ac	650	849	530	539	585	515	829	841	914	616	807	771
SO4S lbs/ac												
B lbs/ac												
Cu lbs/ac												
Mn lbs/ac												
Zn lbs/ac												
Ca Sat'n.	65 %	75 %	70 %	83 %	78 %	78 %	63 %	70 %	61 %	74 %	73 %	73 %
Mg Sat'n.	23 %	22 %	19 %	15 %	20 %	19 %	17 %	21 %	23 %	24 %	24 %	25 %
K Sat'n.	2 %	2 %	2 %	2 %	2 %	2 %	2 %	2 %	2 %	2 %	2 %	3 %
Base Sat'n.	90 %	100 %	91 %	100 %	100 %	100 %	82 %	93 %	85 %	100 %	100 %	100 %
Ca/Mg	2.8	3.3	3.7	5.3	3.8	4.0	3.7	3.3	2.7	3.1	3.0	2.9
Mg/K	9.7	9.5	7.8	8.9	9.3	8.4	8.1	8.6	11.5	11.9	11.6	8.9
Na lbs/ac												
Fe												
SS mS/cm												
lbs/ac												
NO3N ppm												
NH4-N ppm												
Pct. Sand												
Pct. Silt												
Pct. Clay												
Texture												

# Soil Analysis Report

JASON STALEY

CENTRAL OHIO FARMERS COOP WALDO B  
420 W MAIN ST  
00111498 TOM CRAWFORD



Farm

Received: 20-Nov-13

Reported: 22-Oct-14

Lab Number	309903	309904	309905	309906	309907	309908	309909	309910	309911	309912	309913
Field	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK
Sample No.	13	14	15	16	17	18	19	20	21	22	23
C.E.C.	11.0	16.7	12.3	13.5	11.2	9.6	12.7	18.3	10.0	12.4	15.7
Org Matter	3.1	4.0	3.6	3.8	3.0	2.5	3.4	3.8	2.1	2.4	2.8
Soil pH	7.0	6.5	6.6	6.9	7.2	6.7	6.7	6.7	6.4	6.2	7.1
Lime Index	70	68	69	70	70	70	70	59	69	68	70
P lbs/ac	25	66	34	47	31	31	48	49	51	62	110
K lbs/ac	212	274	236	308	233	214	242	321	287	340	387
Ca lbs/ac	3998	4387	3320	4119	3322	2855	3920	5048	2527	2954	4607
Mg lbs/ac	871	732	614	684	641	522	630	986	511	518	884
SO4S lbs/ac											
B lbs/ac											
Cu lbs/ac											
Mn lbs/ac											
Zn lbs/ac											
Ca Sat'n.	77 %	66 %	68 %	76 %	74 %	74 %	77 %	69 %	63 %	60 %	73 %
Mg Sat'n.	21 %	18 %	21 %	21 %	24 %	22 %	20 %	22 %	21 %	17 %	23 %
K Sat'n.	2 %	2 %	3 %	3 %	3 %	3 %	2 %	2 %	4 %	4 %	3 %
Base Sat'n.	100 %	86 %	91 %	100 %	100 %	100 %	100 %	93 %	88 %	80 %	100 %
Ca/Mg	3.6	3.6	3.2	3.6	3.1	3.3	3.7	3.1	3.0	3.4	3.1
Mg/K	10.3	8.7	8.6	7.2	9.0	8.0	8.5	10.0	5.8	5.0	7.4
Na lbs/ac											
Fe											
SS mS/cm											
lbs/ac											
NO3N ppm											
NH4-N ppm											
Pct. Sand											
Pct. Silt											
Pct. Clay											
Texture											



# Soil Analysis Report

JASON STALEY

CENTRAL OHIO FARMERS COOP WALDO B  
420 W MAIN ST  
00111498 TOM CRAWFORD



Farm

Received: 20-Nov-13

Reported: 22-Oct-14

Lab Number	310042	310043	310044	310045	310046	310047	310048	310049	310050	310051	310052	310053
Field	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK
Sample No.	24	25	26	27	28	29	30	31	32	33	34	35
C.E.C.	10.3	13.2	11.2	12.5	17.7	12.0	15.7	15.4	18.8	16.1	14.0	14.6
Org Matter	2.6	2.4	2.2	2.2	3.6	2.3	3.7	3.2	4.5	3.8	5.0	3.6
Soil pH	7.0	6.5	6.1	6.9	6.0	6.5	6.5	6.0	6.6	6.1	6.5	6.3
Lime Index	70	69	68	70	66	69	68	66	68	66	58	68
P lbs/ac	60	39	42	43	100	53	100	59	102	71	72	39
K lbs/ac	342	233	219	207	309	183	388	267	301	304	315	210
Ca lbs/ac	3026	3508	2343	3818	3788	3329	3840	3096	4781	3145	3394	3667
Mg lbs/ac	563	707	643	645	740	539	782	607	981	751	666	683
SO4S lbs/ac												
B lbs/ac												
Cu lbs/ac												
Mn lbs/ac												
Zn lbs/ac												
Ca Sat'n.	73 %	66 %	52 %	76 %	54 %	69 %	61 %	50 %	64 %	49 %	61 %	53 %
Mg Sat'n.	23 %	22 %	24 %	21 %	17 %	19 %	21 %	16 %	22 %	19 %	20 %	19 %
K Sat'n.	4 %	2 %	3 %	2 %	2 %	2 %	3 %	2 %	2 %	2 %	3 %	2 %
Base Sat'n.	100 %	91 %	78 %	100 %	73 %	90 %	85 %	69 %	87 %	71 %	83 %	84 %
Ca/Mg	3.2	3.0	2.2	3.6	3.1	3.7	2.9	3.1	2.9	2.5	3.1	3.2
Mg/K	5.4	9.9	9.6	10.2	7.8	9.6	6.6	7.4	10.6	8.1	6.9	10.6
Na lbs/ac												
Fe												
SS mS/cm												
lbs/ac												
NO3N ppm												
NH4-N ppm												
Pct. Sand												
Pct. Silt												
Pct. Clay												
Texture												

# Soil Analysis Report

JASON STALEY

CENTRAL OHIO FARMERS COOP WALDO B  
420 W MAIN ST  
00111498 TOM CRAWFORD

Farm

Received: 20-Nov-13

Reported: 22-Oct-14



Lab Number	310068	310069	310070	310071	310072	310073	310074	310075	310076	310077	310078
Field	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK
Sample No.	36	37	38	39	40	41	42	43	44	45	46
C.E.C.	17.6	17.9	14.9	11.9	11.7	13.2	14.8	11.4	9.6	10.6	12.3
Org Matter	3.9	4.6	3.0	2.3	2.9	2.7	2.8	2.3	2.3	2.1	2.5
Soil pH	7.1	6.9	6.4	6.5	6.5	6.2	5.9	6.3	6.4	6.5	7.0
Lime Index	70	70	68	69	69	68	66	68	69	69	70
P lbs/ac	38	104	60	26	49	57	59	46	28	25	29
K lbs/ac	230	442	351	195	231	242	245	191	172	146	234
Ca lbs/ac	5249	5152	3601	3229	2976	3008	2792	2593	2489	2826	3526
Mg lbs/ac	1010	1087	751	573	680	711	646	552	476	531	764
SO4S lbs/ac											
B lbs/ac											
Cu lbs/ac											
Mn lbs/ac											
Zn lbs/ac											
Ca Sat'n.	75 %	72 %	60 %	68 %	64 %	57 %	47 %	57 %	65 %	67 %	72 %
Mg Sat'n.	24 %	25 %	21 %	20 %	24 %	23 %	18 %	20 %	20 %	21 %	26 %
K Sat'n.	2 %	3 %	3 %	2 %	3 %	2 %	2 %	2 %	2 %	2 %	2 %
Base Sat'n.	100 %	100 %	84 %	90 %	90 %	82 %	67 %	79 %	88 %	89 %	100 %
Ca/Mg	3.1	2.8	2.9	3.4	2.6	2.5	2.6	2.8	3.1	3.2	2.8
Mg/K	14.3	8.0	7.0	9.6	9.6	9.6	8.6	9.4	9.0	11.9	10.6
Na lbs/ac											
Fe											
SS mS/cm											
lbs/ac											
NO3N ppm											
NH4-N ppm											
Pct. Sand											
Pct. Silt											
Pct. Clay											
Texture											

# Soil Analysis Report

JASON STALEY

CENTRAL OHIO FARMERS COOP WALDO B  
420 W MAIN ST  
00111498 TOM CRAWFORD

Farm

Received: 20-Nov-13

Reported: 22-Oct-14



Lab Number	310109	310110	310111	310112	310113	310114	310115	310116
Field	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK	SALLY COOK
Sample No.	47	48	49	50	51	52	53	54
C.E.C.	10.6	11.6	9.3	11.9	12.7	11.4	10.6	10.1
Org Matter	2.4	3.4	2.5	2.4	2.7	2.3	2.1	1.9
Soil pH	6.5	6.8	6.6	6.5	6.6	6.8	6.4	6.6
Lime Index	69	70	70	69	69	70	69	70
P lbs/ac	31	53	42	34	37	36	29	16
K lbs/ac	184	367	249	245	239	202	151	208
Ca lbs/ac	2542	3279	2537	2977	3277	3320	3052	3010
Mg lbs/ac	673	723	653	714	723	684	378	568
SO4S lbs/ac								
B lbs/ac								
Cu lbs/ac								
Mn lbs/ac								
Zn lbs/ac								
Ca Sat'n.	60 %	71 %	68 %	63 %	65 %	73 %	72 %	75 %
Mg Sat'n.	26 %	26 %	29 %	25 %	23 %	25 %	15 %	23 %
K Sat'n.	2 %	3 %	3 %	3 %	2 %	2 %	2 %	3 %
Base Sat'n.	88 %	100 %	100 %	90 %	90 %	100 %	89 %	100 %
Ca/Mg	3.3	2.7	2.3	2.5	2.7	2.9	4.8	3.2
Mg/K	11.9	7.7	8.9	9.5	9.9	11.0	8.2	9.0
Na lbs/ac								
Fe								
SS mS/cm								
lbs/ac								
NO3N ppm								
NH4-N ppm								
Pct. Sand								
Pct. Silt								
Pct. Clay								
Texture								

Division of Surface Water  
Application for Authorization  
Class B Beneficial Use Sites

Form BUA-4 Page 1 of 2

Beneficial Use Site Information

Ohio EPA Site I.D. (Ohio EPA Use Only)

Field site I.D.: MOQ-08-03	
Beneficial use site location: 1 mi W of Worthington-New Haven Rd. on S side of Prospect Mt. Vernon Rd.	
County: Morrow	Township: Peru
Latitude: 40°25'9.31"N	Longitude: 82°52'37.57"W

Total acreage proposed for beneficial use: 49.2															
Soil pH (s.u.): 6.6	Soil phosphorus (mg/kg): 25.8														
Bedrock depth (feet): >3ft	Bray Kurtz P1 <input checked="" type="checkbox"/> Mehlich 3 <input type="checkbox"/>														
Type of crops to be grown:															
<table border="1"><thead><tr><th>Crop Type</th><th>Expected Yield</th></tr></thead><tbody><tr><td>Corn</td><td>185 bu</td></tr><tr><td>Soybeans</td><td>60 bu</td></tr><tr><td>Wheat</td><td></td></tr><tr><td>Pasture</td><td></td></tr><tr><td>Hay</td><td></td></tr><tr><td>Other:</td><td></td></tr></tbody></table>		Crop Type	Expected Yield	Corn	185 bu	Soybeans	60 bu	Wheat		Pasture		Hay		Other:	
Crop Type	Expected Yield														
Corn	185 bu														
Soybeans	60 bu														
Wheat															
Pasture															
Hay															
Other:															

**Division of Surface Water**  
Application for Authorization  
Class B Beneficial Use Sites

Soil Types:

Soil Unit Symbol	Soil Unit Name	Hydrologic Soil Group
Ble1A1	Blount silt loam, end moraine, 0 to 2 percent slopes	D
Ble1B1	Blount silt loam, end moraine, 2 to 4 percent slopes	D
Gwe5B2	Glynwood clay loam, end moraine, 2 to 6 percent slopes, eroded	D
Pm	Pewamo silty clay loam	C/D

Are any endangered species or endangered species habitats located on the beneficial use site?

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
------------------------------	--

If "Yes" is marked, list the types of endangered species or endangered species habitat:

--	--

Have biosolids been beneficially used on the site since July 20, 1993?

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
------------------------------	--

If "Yes" is marked, list the biosolids generators and years beneficial use occurred:

Generator	Year of Beneficial Use

The application must also include all of the following.

- A soil map of the proposed beneficial use site.
- An aerial map of the proposed beneficial use site that clearly identifies the entrance of the beneficial use site from the nearest road and all applicable isolation distances as established in Chapter 3745-40 of the Ohio Administrative Code.
- A vicinity road map at or near the township level that clearly identifies the proposed beneficial use site with all roads labeled.
- A copy of the most recent soil test results identified in this form.

# Staley MOQ-08-03

## Total Acreage: 49.2 acres



0 150 300 600 Feet

- Residences
- 100ft Res Buffer
- 300ft Res Buffer
- Waterways
- 33ft Water Buffer



# Staley MOQ-08-03

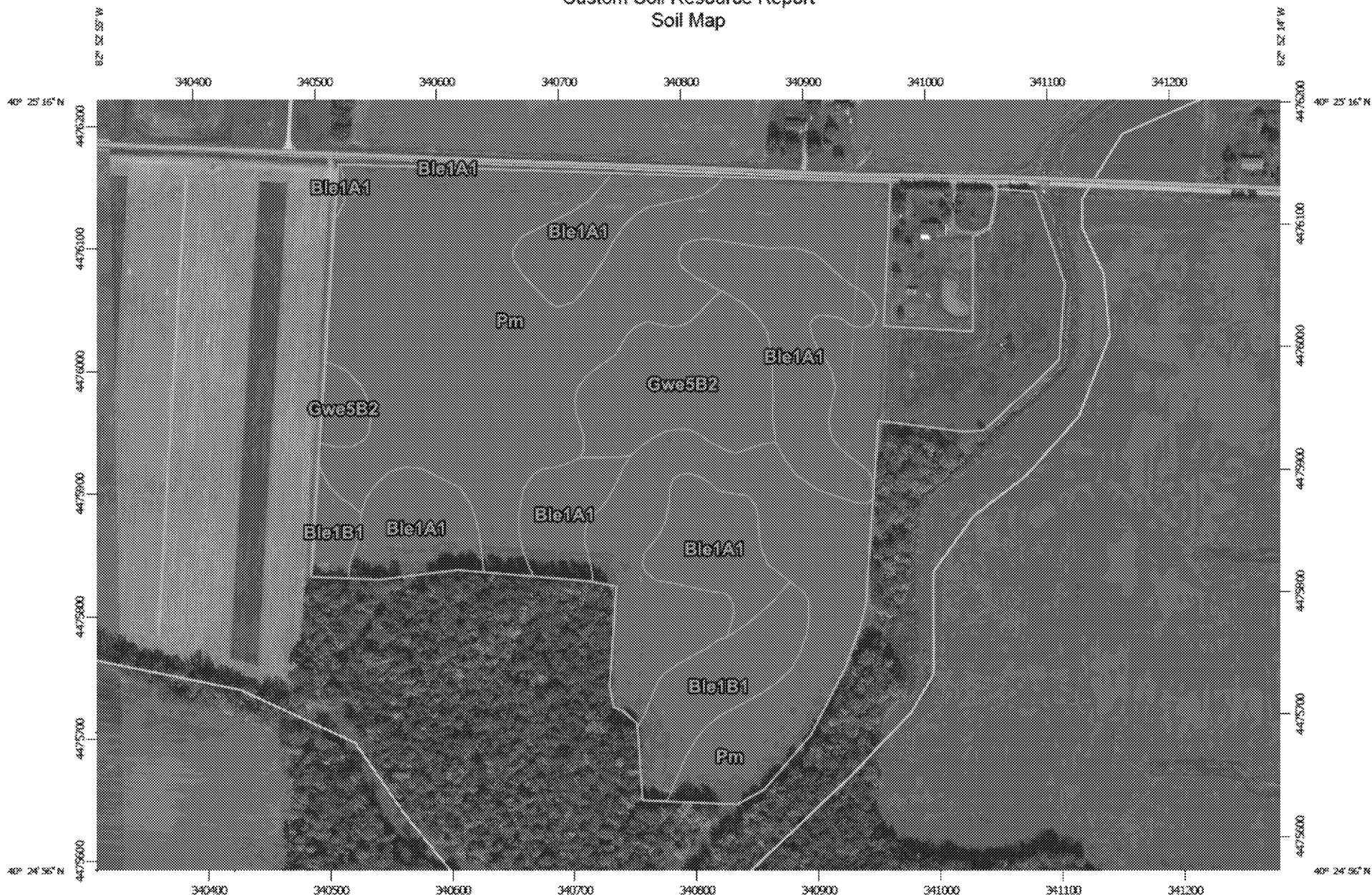
Total Acreage: 49.2 acres



0 150 300 600 Feet

— 5ft Contours

# Custom Soil Resource Report Soil Map



Map Scale: 1:4,430 if printed on A landscape (11" x 8.5") sheet.

0 50 100 200 300 Meters


0 200 400 800 1200 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

## Custom Soil Resource Report


### MAP LEGEND

#### Area of Interest (AOI)

 Area of Interest (AOI)


#### Soils


 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

#### Special Point Features


 Blowout


 Borrow Pit


 Clay Spot


 Closed Depression


 Gravel Pit


 Gravelly Spot

 Landfill


 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop

 Saline Spot


 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip


 Sodic Spot


 Spoil Area

 Stony Spot


 Very Stony Spot

 Wet Spot


 Other


 Special Line Features


#### Water Features

 Streams and Canals


#### Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

#### Background

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morrow County, Ohio  
Survey Area Data: Version 13, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 5, 2011—Mar 10, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Morrow County, Ohio (OH117)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ble1A1	Blount silt loam, end moraine, 0 to 2 percent slopes	10.6	21.6%
Ble1B1	Blount silt loam, end moraine, 2 to 4 percent slopes	3.0	6.2%
Gwe5B2	Glynwood clay loam, end moraine, 2 to 6 percent slopes, eroded	4.3	8.8%
Pm	Pewamo silty clay loam	31.1	63.4%
<b>Totals for Area of Interest</b>		<b>49.1</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic

## Morrow County, Ohio

### Ble1A1—Blount silt loam, end moraine, 0 to 2 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2s1j4  
*Elevation:* 700 to 1,300 feet  
*Mean annual precipitation:* 34 to 42 inches  
*Mean annual air temperature:* 48 to 54 degrees F  
*Frost-free period:* 140 to 180 days  
*Farmland classification:* Prime farmland if drained

#### Map Unit Composition

*Blount, end moraine, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Blount, End Moraine

##### Setting

*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Wisconsin till derived from limestone and shale

##### Typical profile

*Ap - 0 to 10 inches:* silt loam  
*Bt - 10 to 33 inches:* silty clay  
*BC - 33 to 39 inches:* clay loam  
*Cd - 39 to 79 inches:* clay loam

##### Properties and qualities

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* 30 to 60 inches to densic material  
*Natural drainage class:* Somewhat poorly drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately high  
(0.01 to 0.20 in/hr)  
*Depth to water table:* About 6 to 12 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 35 percent  
*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)  
*Available water storage in profile:* Moderate (about 6.2 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* D

#### Minor Components

##### Glynwood, end moraine

*Percent of map unit:* 9 percent

*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Backslope, summit  
*Landform position (three-dimensional):* Side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex

**Pewamo, end moraine**

*Percent of map unit:* 6 percent  
*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear, concave  
*Across-slope shape:* Linear, concave

**Ble1B1—Blount silt loam, end moraine, 2 to 4 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 2s1j5  
*Elevation:* 700 to 1,300 feet  
*Mean annual precipitation:* 34 to 42 inches  
*Mean annual air temperature:* 48 to 54 degrees F  
*Frost-free period:* 140 to 180 days  
*Farmland classification:* Prime farmland if drained

**Map Unit Composition**

*Blount, end moraine, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Blount, End Moraine**

**Setting**

*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Footslope, backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Wisconsin till derived from limestone and shale

**Typical profile**

*Ap - 0 to 9 inches:* silt loam  
*Bt - 9 to 32 inches:* silty clay  
*BC - 32 to 37 inches:* clay loam  
*Cd - 37 to 79 inches:* clay loam

**Properties and qualities**

*Slope:* 2 to 4 percent  
*Depth to restrictive feature:* 30 to 56 inches to densic material  
*Natural drainage class:* Somewhat poorly drained  
*Runoff class:* High



## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately high  
(0.01 to 0.20 in/hr)

*Depth to water table:* About 6 to 12 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum in profile:* 35 percent

*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)

*Available water storage in profile:* Low (about 5.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

*Hydrologic Soil Group:* D

### Minor Components

#### Glynwood, end moraine

*Percent of map unit:* 9 percent

*Landform:* End moraines on till plains

*Landform position (two-dimensional):* Backslope, summit

*Landform position (three-dimensional):* Side slope, crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

#### Pewamo, end moraine

*Percent of map unit:* 6 percent

*Landform:* End moraines on till plains

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Concave

*Across-slope shape:* Concave

### Gwe5B2—Glynwood clay loam, end moraine, 2 to 6 percent slopes, eroded

#### Map Unit Setting

*National map unit symbol:* 2t6lj

*Elevation:* 720 to 1,320 feet

*Mean annual precipitation:* 34 to 42 inches

*Mean annual air temperature:* 48 to 54 degrees F

*Frost-free period:* 140 to 180 days

*Farmland classification:* All areas are prime farmland

#### Map Unit Composition

*Glynwood, end moraine, and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Description of Glynwood, End Moraine

### Setting

*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Shoulder, summit  
*Landform position (three-dimensional):* Side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear, convex  
*Parent material:* Wisconsin till derived from limestone and shale

### Typical profile

*Ap - 0 to 7 inches:* clay loam  
*Bt - 7 to 26 inches:* clay  
*BC - 26 to 30 inches:* clay loam  
*Cd - 30 to 79 inches:* clay loam

### Properties and qualities

*Slope:* 2 to 6 percent  
*Depth to restrictive feature:* 24 to 42 inches to densic material  
*Natural drainage class:* Moderately well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately high (0.01 to 0.20 in/hr)  
*Depth to water table:* About 12 to 24 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 35 percent  
*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)  
*Available water storage in profile:* Low (about 4.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2e  
*Hydrologic Soil Group:* D

## Minor Components

### Blount, end moraine

*Percent of map unit:* 9 percent  
*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Footslope, backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

### Pewamo

*Percent of map unit:* 6 percent  
*Landform:* End moraines on till plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave

## **Pm—Pewamo silty clay loam**

### **Map Unit Setting**

*National map unit symbol:* 5q8m  
*Elevation:* 600 to 1,400 feet  
*Mean annual precipitation:* 29 to 42 inches  
*Mean annual air temperature:* 46 to 55 degrees F  
*Frost-free period:* 130 to 180 days  
*Farmland classification:* Prime farmland if drained

### **Map Unit Composition**

*Pewamo and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Pewamo**

#### **Setting**

*Landform:* Depressions, drainageways  
*Parent material:* Till

#### **Typical profile**

*H1 - 0 to 15 inches:* silty clay loam  
*H2 - 15 to 66 inches:* silty clay loam  
*H3 - 66 to 80 inches:* clay loam

#### **Properties and qualities**

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Very poorly drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)  
*Depth to water table:* About 0 to 12 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* Frequent  
*Calcium carbonate, maximum in profile:* 30 percent  
*Available water storage in profile:* High (about 10.2 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* C/D

### **Minor Components**

#### **Sloan**

*Percent of map unit:* 3 percent  
*Landform:* Flood plains

**Condit**

*Percent of map unit:* 3 percent  
*Landform:* Depressions on ground moraines  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave

**Carlisle**

*Percent of map unit:* 3 percent  
*Landform:* Depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave

**Bennington**

*Percent of map unit:* 3 percent  
*Landform:* Rises on ground moraines, rises on end moraines, flats on ground moraines, flats on end moraines  
*Landform position (two-dimensional):* Summit, shoulder  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

**Blount**

*Percent of map unit:* 3 percent  
*Landform:* Flats on ground moraines, flats on end moraines, rises on ground moraines, rises on end moraines  
*Landform position (two-dimensional):* Summit, shoulder  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

**More sand and less clay in the subsoil**

*Percent of map unit:*  
*Landform:* Depressions, drainageways

**Thinner or lighter colored surface layer**

*Percent of map unit:*  
*Landform:* Depressions, drainageways

**Slopes of 3 or 4 percent**


*Percent of map unit:*  
*Landform:* Depressions, drainageways

Custom Soil Resource Report  
Map—Depth to Any Soil Restrictive Layer (MOQ-08-03)










## MAP LEGEND

### Area of Interest (AOI)








 Area of Interest (AOI)

### Soils







#### Soil Rating Polygons


-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

#### Soil Rating Lines


-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

#### Soil Rating Points

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200

 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morrow County, Ohio  
Survey Area Data: Version 13, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 5, 2011—Mar 10, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

**Table—Depth to Any Soil Restrictive Layer (MOQ-08-03)**

Depth to Any Soil Restrictive Layer— Summary by Map Unit — Morrow County, Ohio (OH117)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
Ble1A1	Blount silt loam, end moraine, 0 to 2 percent slopes	99	10.6	21.6%
Ble1B1	Blount silt loam, end moraine, 2 to 4 percent slopes	94	3.0	6.2%
Gwe5B2	Glynwood clay loam, end moraine, 2 to 6 percent slopes, eroded	76	4.3	8.8%
Pm	Pewamo silty clay loam	>200	31.1	63.4%
<b>Totals for Area of Interest</b>			<b>49.1</b>	<b>100.0%</b>

**Rating Options—Depth to Any Soil Restrictive Layer (MOQ-08-03)**

*Units of Measure:* centimeters

*Aggregation Method:* Dominant Component

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Lower

*Interpret Nulls as Zero:* No

**Hydrologic Soil Group (MOQ-08-03)**

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

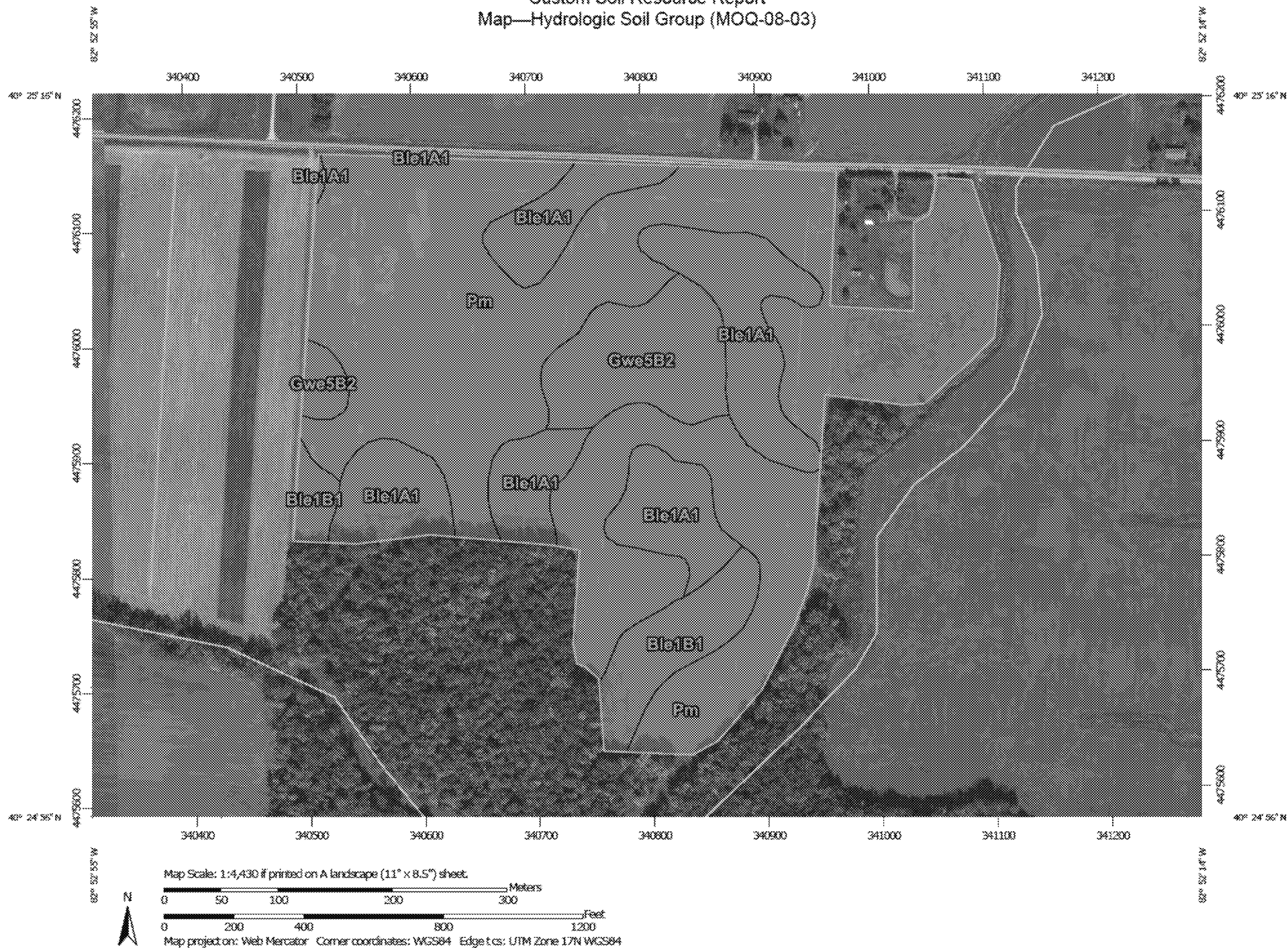
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils




Custom Soil Resource Report  
Map—Hydrologic Soil Group (MOQ-08-03)











## MAP LEGEND

### Area of Interest (AOI)









 Area of Interest (AOI)

### Soils





#### Soil Rating Polygons





 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines


 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points

 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

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 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Morrow County, Ohio  
 Survey Area Data: Version 13, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 5, 2011—Mar 10, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

**Table—Hydrologic Soil Group (MOQ-08-03)**

Hydrologic Soil Group— Summary by Map Unit — Morrow County, Ohio (OH117)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ble1A1	Blount silt loam, end moraine, 0 to 2 percent slopes	D	10.6	21.6%
Ble1B1	Blount silt loam, end moraine, 2 to 4 percent slopes	D	3.0	6.2%
Gwe5B2	Glynwood clay loam, end moraine, 2 to 6 percent slopes, eroded	D	4.3	8.8%
Pm	Pewamo silty clay loam	C/D	31.1	63.4%
<b>Totals for Area of Interest</b>			<b>49.1</b>	<b>100.0%</b>

**Rating Options—Hydrologic Soil Group (MOQ-08-03)**

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

# Soil Analysis Report

JASON STALEY

CENTRAL OHIO FARMERS COOP WALDO B  
420 W MAIN ST  
00111498 TOM CRAWFORD

Farm

Received: 20-Nov-13

Reported: 22-Oct-14



Lab Number	310202	310203	310204	310205	310206	310207	310208	310209	310210	310211	310212	310213
Field	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS
Sample No.	1	2	3	4	5	6	7	8	9	10	11	12
C.E.C.	16.8	14.0	10.7	14.4	17.3	16.0	15.2	15.4	15.2	17.2	14.2	16.0
Org Matter	3.5	3.8	2.2	3.0	4.3	3.9	3.1	2.7	3.4	4.8	3.8	3.5
Soil pH	6.5	6.8	7.0	6.7	6.9	6.4	6.1	6.1	6.4	6.9	6.8	6.6
Lime Index	68	70	70	70	70	68	67	67	68	70	70	69
P lbs/ac	41	82	41	46	88	42	48	55	53	88	49	51
K lbs/ac	355	298	262	383	346	334	381	340	248	330	271	361
Ca lbs/ac	4429	4161	3104	4299	5177	4214	3524	3523	3888	5092	4145	4265
Mg lbs/ac	709	771	632	759	939	644	562	621	665	976	841	904
SO4S lbs/ac												
B lbs/ac												
Cu lbs/ac												
Mn lbs/ac												
Zn lbs/ac												
Ca Sat'n.	66 %	74 %	73 %	75 %	75 %	66 %	58 %	57 %	64 %	74 %	73 %	67 %
Mg Sat'n.	17 %	23 %	24 %	22 %	22 %	17 %	15 %	17 %	18 %	23 %	24 %	23 %
K Sat'n.	3 %	3 %	3 %	3 %	3 %	3 %	3 %	3 %	2 %	3 %	2 %	3 %
Base Sat'n.	86 %	100 %	100 %	100 %	100 %	86 %	76 %	77 %	84 %	100 %	100 %	93 %
Ca/Mg	3.7	3.2	2.9	3.4	3.3	3.9	3.8	3.4	3.5	3.1	3.0	2.8
Mg/K	6.5	8.4	7.9	6.5	8.8	6.3	4.8	6.0	6.7	9.6	10.1	8.2
Na lbs/ac												
Fe												
SS mS/cm												
lbs/ac												
NO3N ppm												
NH4-N ppm												
Pct. Sand												
Pct. Silt												
Pct. Clay												
Texture												

# Soil Analysis Report

JASON STALEY

CENTRAL OHIO FARMERS COOP WALDO B  
420 W MAIN ST  
00111498 TOM CRAWFORD

Farm

Received: 20-Nov-13

Reported: 22-Oct-14



Lab Number	309788	309789	309790	309791	309792	309793	309794
Field	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS	SALLY ELLIS
Sample No.	13	14	15	16	17	18	19
C.E.C.	12.5	11.8	12.2	12.0	9.3	15.3	13.9
Org Matter	2.7	2.0	2.3	2.5	1.8	4.0	3.1
Soil pH	6.4	6.5	6.2	6.3	7.1	6.7	7.1
Lime Index	69	69	68	68	70	69	70
P lbs/ac	36	48	44	39	49	53	28
K lbs/ac	228	193	214	163	154	268	210
Ca lbs/ac	3401	3202	2895	2895	2785	4448	4276
Mg lbs/ac	616	576	581	529	522	652	721
SO4S lbs/ac							
B lbs/ac							
Cu lbs/ac							
Mn lbs/ac							
Zn lbs/ac							
Ca Sat'n.	68 %	68 %	59 %	60 %	75 %	73 %	77 %
Mg Sat'n.	20 %	20 %	19 %	18 %	33 %	18 %	21 %
K Sat'n.	2 %	2 %	2 %	2 %	2 %	2 %	2 %
Base Sat'n.	91 %	90 %	80 %	80 %	100 %	93 %	100 %
Ca/Mg	3.3	3.3	3.1	3.3	3.2	4.1	3.6
Mg/K	8.8	9.7	8.5	10.6	11.1	7.9	11.2
Na lbs/ac							
Fe							
SS mS/cm							
lbs/ac							
NO3N ppm							
NH4-N ppm							
Pct. Sand							
Pct. Silt							
Pct. Clay							
Texture							